# SECTION 03 53 00

# CONCRETE TOPPING

## PART 1 – GENERAL

### 1.01 SECTION INCLUDES

A. Formwork.

B. Reinforcing Steel.

C. Bond Breaker Membrane.

D. Joint Fillers and Sealers.

E. Portland Cement Concrete.

F. Nonslip Aggregate Materials.

G. Concrete Hardener.

H. Concrete Curing Materials.

### 1.02 RELATED SECTION

A. Cast-in-place concrete is specified in Section 03 30 00, Cast-In-Place Concrete.

B. Portland cement concrete is specified in Section 03 05 15, Portland Cement Concrete.

C. Finishing and curing of concrete slabs are specified in Section 03 35 00, Concrete Finishing.

D. Formwork is specified in Section 03 11 00, Concrete Forming.

E. Reinforcing Steel is specified in 03 20 00, Concrete Reinforcing.

### 1.03 MEASUREMENT AND PAYMENT

A. General: Measurement and payment for concrete topping slabs will be either by the lump-sum method or by the unit-price method as determined by the listing of the bid item for concrete topping slabs indicated in the Bid Schedule of the Bid Form.

B. Lump-Sum: If the Bid Schedule indicates a lump-sum for concrete topping slabs, the lump-sum method of measurement and payment will be in accordance with Section 01 20 00, Price and Payment Procedures, Article 1.03.

C. Unit Prices: If the Bid Schedule indicates a unit price for concrete topping slabs, the unit-price method of measurement and payment will be as follows:

1. Measurement

2. Concrete topping slabs will be measured for payment by the cubic yard, and quantities will be computed, based on the neat lines or pay lines, section profiles, and dimensions shown on the Contract Drawings, without deduction for chamfers, reinforcing steel and embedded items, and openings and recesses having an area of less than two square feet.

   a. Expansion joints will not be measured separately for payment.

   b. Additional concrete used to replace overcut or for overbreak, or to repair or replace defective work, will not be measured separately for payment.

3. Payment: Concrete topping slabs will be paid for at the indicated Contract unit prices for the computed quantities as determined by the measurement method specified above.

## 1.04 REFERENCES

A. American Concrete Institute (ACI):

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|---|---|---|
| 1. | ACI 117 | Specification for Tolerances for Concrete Construction and Materials and Commentary |
| 2. | ACI 301 | Specifications for Structural Concrete |
| 3. | ACI 302.1R | Recommended Practice for Concrete Floor and Slab Construction |
| 4. | ACI 304 | Measuring, Mixing, Transporting, and Placing Concrete |

B. American Society for Testing and Materials (ASTM):

| | | |
|---|---|---|
| 1. | ASTM C618 | Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete |
| 2. | ASTM C1017/ C1017M | Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete |
| 3. | ASTM D1751 | Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types) |
| 4. | ASTM D2178/ D2178M | Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing |
| 5. | ASTM D2047 | Test Method for Static Coefficient of Friction of Polish-Coated Floor Surfaces as Measured by the James Machine |

C. United States Access Board

1. ADAAG Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities

## 1.05 SUBMITTALS

A. General: Refer to Section 01 33 00, Submittal Procedures, and Section 01 33 23, Shop Drawings, Product Data, and Samples, for submittal requirements and procedures.

B. Shop Drawings:

1. Submit drawings that indicate the locations of all joints in concrete slabs, including construction joints, expansion joints, isolation joints, weakened plane joints and contraction joints. Comply with the requirements specified in Section 03 11 00, Concrete Forming.

2. Submit drawings that indicate concrete placement method, sequence, and location.

C. Product Data: Submit manufacturers' product data for nonslip floor ingredients, concrete hardener material, control joint sealant, and expansion joint sealant.

D. Samples: Submit 1/2-pint sample container of aluminum oxide anti-slip materials for approval. Samples require approval of the Engineer before they may be incorporated in the Work.

## 1.06 QUALITY ASSURANCE

A. Specialist Applicator and Installer: Topping slabs shall be installed and finished by a skilled and experienced installer specializing in the installation and finishing of architectural concrete slabs. The Contractor shall submit evidence that the slab installer and finisher is approved by the manufacturer of the nonslip materials.

B. Floor Finish: "Nonslip finish" in combination with a "troweled finish" or fine "broom finish" conforming to applicable requirements of ACI 301.

C. Floor Tolerance: "Flat" tolerance conforming to ACI 117.

D. Cold Joints: Cold joints in concrete will not be permitted unless planned and treated properly as construction joints and submitted for approval as specified under submittals above.

E. Site Mock-Ups: Refer to Section 01 43 38, Field Samples and Mockups, for mock-up requirements. Provide site mock-up, at least 3 feet by 4 feet in size, of exposed slab finish for the Engineer's review and approval. Provide additional mock-ups, as required, until the desired finish is obtained. Site mock-up requires approval of the Engineer before work may proceed.

1. Different concrete finishes and colors shall be included and represented on the sample mock-up panel with a minimum 18 by 18 inch area for each different finish.

2. Include typical expansion joint detail and control joint in mock-up.

3. Approved sample panel shall not remain as part of the Work. Remove sample after final Acceptance of project.

F. Manufacturer's Instructions: Application of the nonslip floor ingredients and concrete hardener material and finishing of the concrete topping slabs shall be in accordance with the written or printed instructions and recommendations of the manufacturer of nonslip floor ingredients and concrete hardener materials.

G. Manufacturer's Field Services: The Contractor shall engage the manufacturer of the nonslip floor ingredients and concrete hardener materials to provide field services in accordance with the requirements of Section 01 43 00, Quality Assurance.

H. Surfaces shall maintain a minimum coefficient of friction as specified by the ADAAG Appendix to Part 1192 Advisory Guidelines Section 1.

## PART 2 – PRODUCTS

### 2.01 TOOLS AND EQUIPMENT

A. The Contractor shall furnish all materials, tools, equipment, facilities, and services as required for performing the required topping slab placing and finishing work.

### 2.02 MATERIALS

A. Formwork: Refer to Section 03 11 00, Concrete Forming, for requirements.

B. Reinforcing Steel: Refer to Section 03 20 00, Concrete Reinforcing, for requirements.

C. Bond Breaker Membrane: ASTM D2178/D2178M asphalt glass felt, Type III - standard ply sheet.

D. Joint Fillers and Sealers: Refer to Section 03 15 00, Concrete Accessories, for requirements.

E. Portland Cement Concrete: Comply with Section 03 05 15, Portland Cement Concrete, and the following requirements:

1. Topping slab concrete shall have a minimum compressive strength at 28 Days of 4,000 psi. Maximum size of aggregate shall be one inch, except that 3/8 inch maximum size aggregate shall be used for locations where congestion and other conditions indicate the need for smaller aggregate. Minimum cement content per cubic yard of concrete shall be six and a half 94-pound sacks.

2. Mix design for topping-slab concrete shall include up to ten percent replacement of the cement content with fly ash (ASTM C618) along with a plasticizing admixture, conforming with ASTM C1017/C1017M, to provide a dense and plastic concrete mix which will trowel more easily with less surface bleeding of water.

F. Nonslip Aggregate Material: Crushed ceramically bonded or fused aluminum oxide as specified in ACI 301. Provide 25 pounds per 100 square feet as specified. All aggregate particles shall pass a No. 8 U.S. Standard Sieve, and shall be graded from No. 16 to No. 8 mesh.

G. Concrete Hardener and Dustproofer: Chemical clear liquid hardener which produces a dense, hard, and dustproof concrete surface, manufactured specifically for the intended purpose.

H. Concrete Curing Materials: Refer to Section 03 35 00, Concrete Finishing, for requirements.

1. Provide for damp curing only. Curing compound will not be permitted on floors to receive concrete hardener and dustproofer.

## 2.03 CONTROL AND EXPANSION JOINT SEALANT

A. Joint Filler and Sealants: Refer to Section 03 15 00, Concrete Accessories, for requirements. Provide a two-component elastomeric polyurethane sealant that is mixed and poured in place. When cured, it shall form a resilient joint seal with a high resistance to penetration and abrasion, and shall remain flexible through exposure to weather and aging. Sealant shall be self-leveling.

B. Sealant Color: Submit color chart in accordance with submittal requirements of this Section 07 90 00, Joint Protection.

C. Expansion Joint Filler: One-half inch thick in accordance with ASTM D1751, pre-molded non-extruding asphalt impregnated felt.

## 2.04 CONTROL JOINT FORMING

A. Comply with requirements of Section 03 30 00, Cast-In-Place Concrete.

B. Control joints shall be straight and true, of equal depth and width the full length of the joint. Arrange and locate joints as shown on the Construction Drawings.

C. Form control joints only by saw cutting surface of concrete.

# PART 3 – EXECUTION

## 3.01 INSTALLATION REQUIREMENTS:

A. The requirements of Section 03 30 00, Cast-In-Place Concrete, Section 03 05 15, Portland Cement Concrete, and Section 03 35 00, Concrete Finishing, shall apply to the work of this Section as applicable.

## 3.02 EXAMINATION

A. Inspect forms, structural slab surfaces, waterproof membranes and protection board where they occur, reinforcement, and embedded items, and obtain the Engineer's approval thereof before placing concrete. Complete and sign a pour card on the form supplied by the Engineer. The Engineer will countersign the card prior to commencing the pour.

## 3.03 PREPARATION

A. At least 48 hours prior to actual placement, notify the Engineer and nonslip material manufacturer's representative of the intention to deliver and place concrete.

B. Before placing concrete, broom clean structural slab surfaces and install bond breaker membrane where indicated. Lap edges and ends of asphalt glass felt 6 inches. Small dabs of bituminous cement may be used to hold felt sheets in place during subsequent placing operations.

## 3.04 PLACING AND FINISHING

A. Placement and Finishing Standards: Concrete topping slabs shall be placed, consolidated, and finished in accordance with applicable requirements of ACI 301.

B. Placement:

1. Topping slabs shall be placed and finished monolithically. Strike off and screed slabs to true, plane surfaces at required elevations, and thoroughly compact concrete with vibrators, floats, and tampers to force coarse aggregate below the surface. Finish slab within four hours of concrete placement.

2. Whether indicated or not, in areas where drains occur, slope finished slab to drains. Slope shall be a minimum of 1/8 inch per foot unless otherwise indicated.

C. Finishes:

1. Topping slabs shall receive a "troweled finish" or fine "broom finish" in combination with a "nonslip finish," as selected by the Engineer from Contractor-prepared mock-ups, with "flat" tolerance, as specified in ACI 117.

2. Application of the nonslip material and finishing of the topping slabs shall conform with the nonslip material manufacturer's application instructions and recommendations.

## 3.05 CURING

A. Curing of concrete topping slabs shall conform with applicable requirements of ACI 301, except that the duration of the curing period shall be ten Days minimum.

B. Provide damp curing only as specified in Section 03 35 00, Concrete Finishing. Curing compounds will not be permitted.

## 3.06 APPLICATION OF CONCRETE HARDENER

A. Allow slab surfaces to cure and dry a minimum period of 28 Days before applying hardener/dustproofer material. Slab surfaces shall be clean and dry at the time hardener/dustproofer material is applied.

B. Apply clear liquid hardener/dustproofer compound to slab surfaces, after the damp-curing and drying period, in accordance with the manufacturer's application instructions. Rate of application and number of coats shall conform with the manufacturer's instructions and recommendations.

## 3.07 PROTECTION

A. Protect exposed concrete slab surfaces as required to prevent damage from impact or stains.

B. Protect fresh concrete from drying winds, rain, damage, or soiling.

C. Refer to Section 03 30 00, Cast-In-Place Concrete, Article 3.09, for additional requirements.

**END OF SECTION 03 53 00**